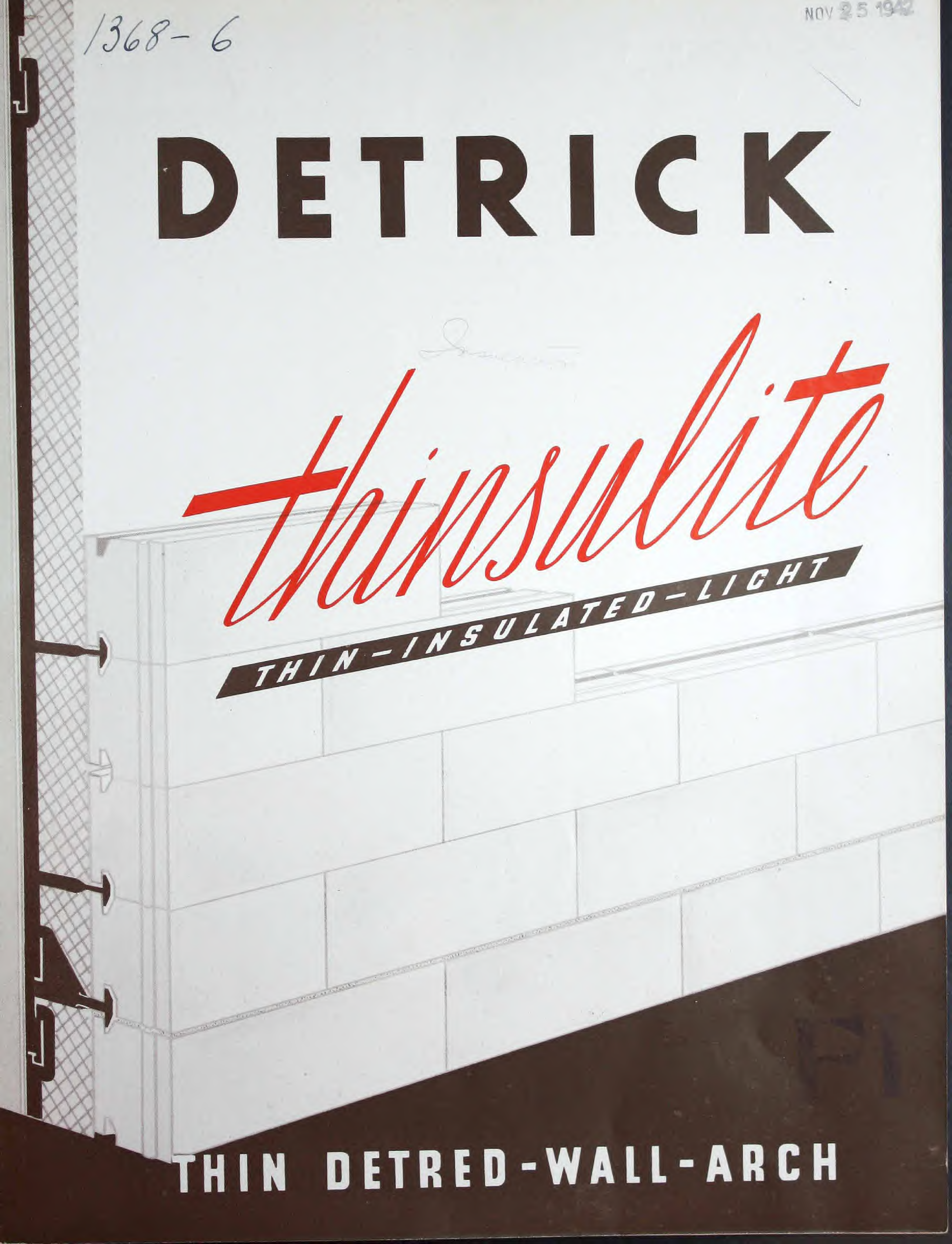
DETRICK

Thinsulite

THIN—INSULATED—LIGHT



THIN DETRED-WALL-ARCH

Economy WITH THINSULITE

● Detrick offers a new type of SUSPENDED construction . . . filling a broad need for many types of Furnace applications, particularly those where temperatures are moderate and where abrasion of the refractory is not likely to occur.

CONSTRUCTION SIMPLICITY CONSTRUCTION ECONOMY

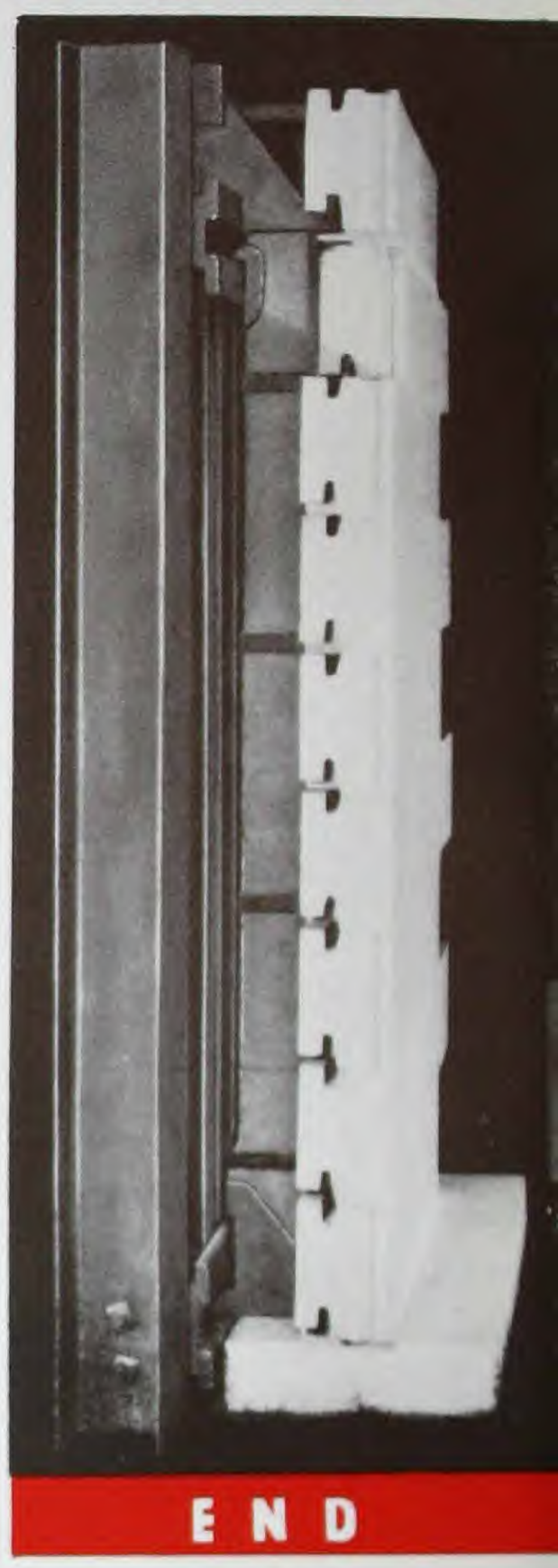
The simplicity of any construction depends upon the simplicity of its elements. One shape of THINSULITE tile is used for both arch and wall. Only the horizontal castings are bolted to the buckstays; the vertical castings and the tile-retaining castings merely *hang* in place with the same flexibility as all Detrick constructions.

The actual tile-retaining and supporting castings are both designed with an economical section . . . first, to minimize the amount of heat conducted from the wall . . . and second, so that they can be made of the proper grade of iron for the temperature to be encountered, without adding greatly to the cost.

The vertical and retaining castings are designed to support and tie-in the insulation without other means . . . and to take a simple casing arrangement when desired. The wall is designed to take a permanent weather proof finish of semi-insulating material.

ENGINEERED ECONOMY

THINSULITE construction means economy of material and labor, therefore economy of first cost . . . economy of time during installation . . . economy of heat loss and air leakage and thereby economy of operation.



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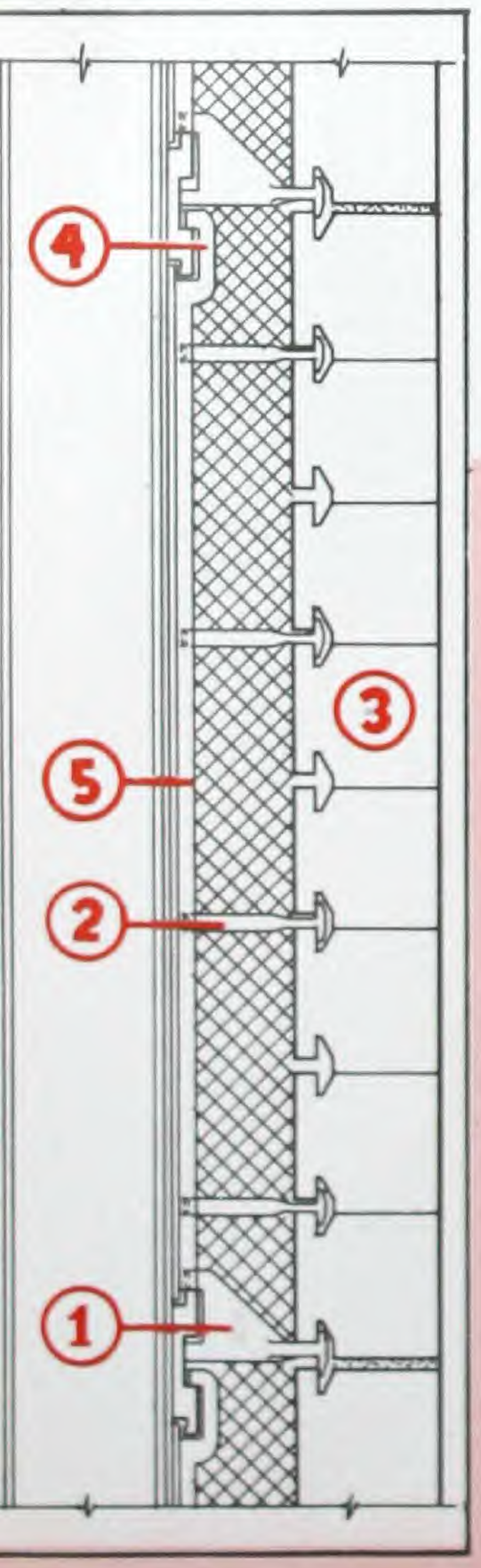


Section through THINSULITE Wall showing simple method of attaching Vertical and Horizontal Castings to Buckstays and method of supporting and retaining refractory Wall and insulation.

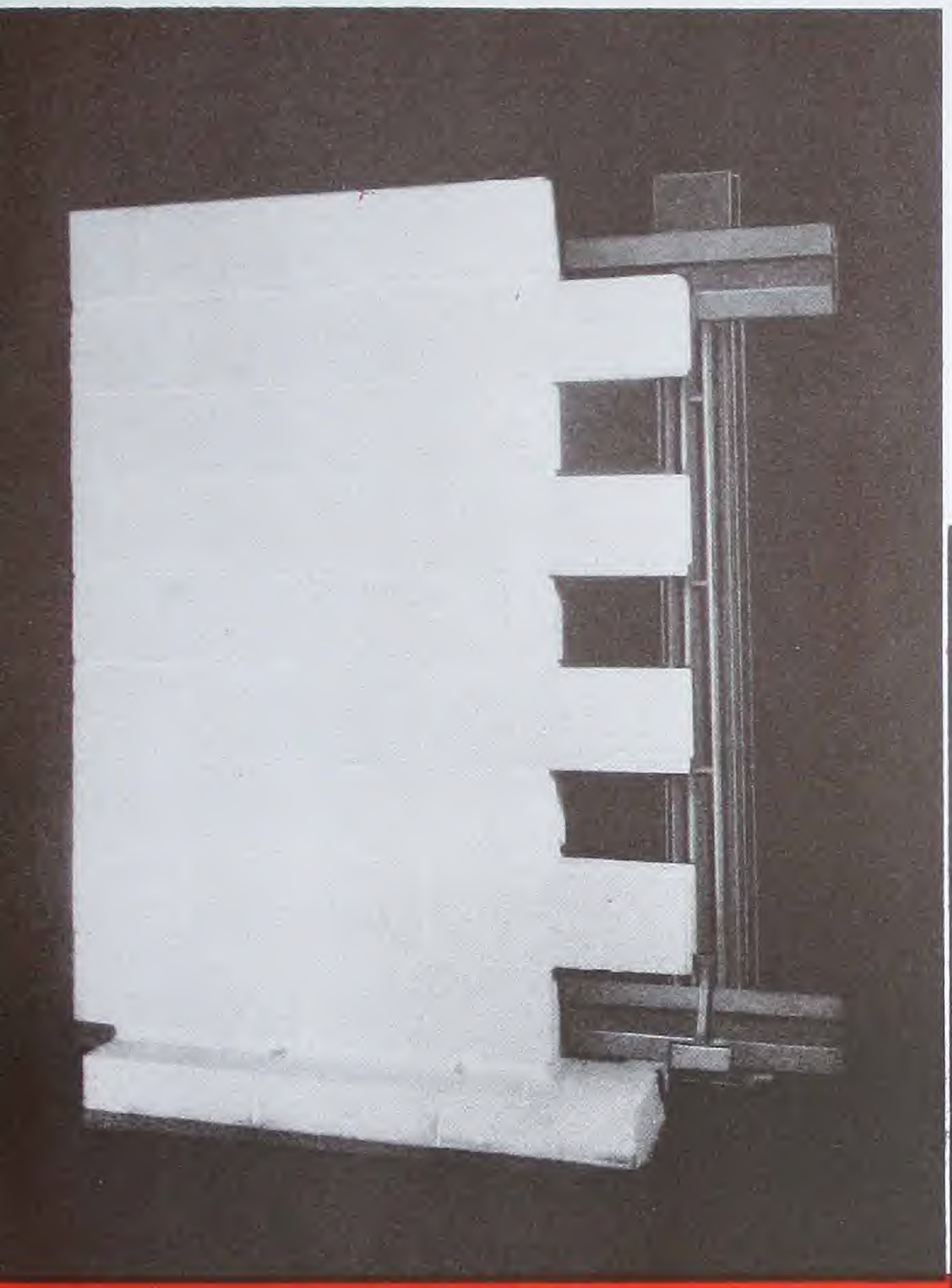
●

1. *Supporting Shelf Casting*
2. *Retaining Casting*
3. *THINSULITE Tile — 3" or 4½"*
4. *Horizontal Support Bar*
5. *Vertical Retaining Bar*

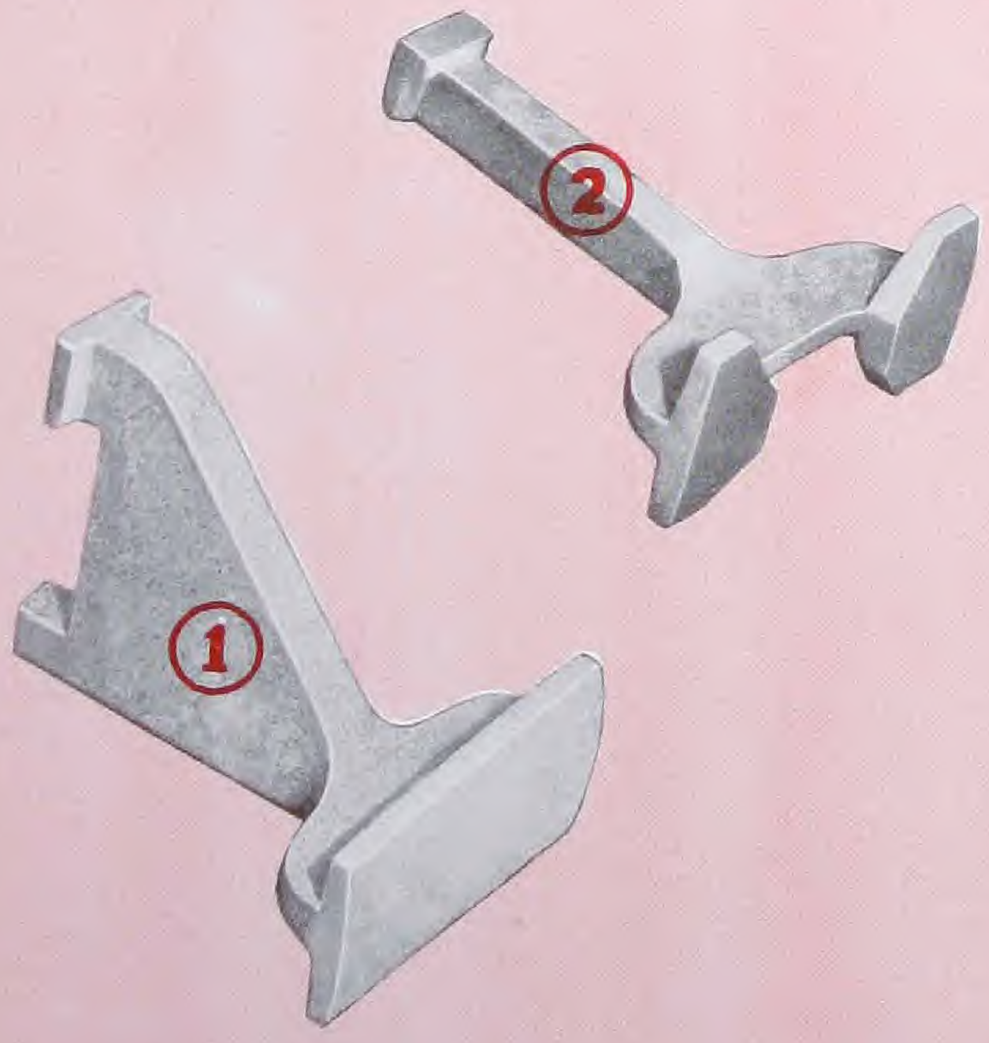
●

walls AND *arches*

STREAMLINED CONSTRUCTION with ENGINEERED ECONOMY



FRONT



MANY OUTSTANDING ADVANTAGES

Low cost of material and labor.

Light weight.

Low heat loss.

Permanent flexible structure . . . low up-keep cost.

Air tight and heat tight.

Built under Detrick DETRED principles to obtain the advantages of the heavier Detrick constructions.

BACK

PERMANENT STRUC

walls

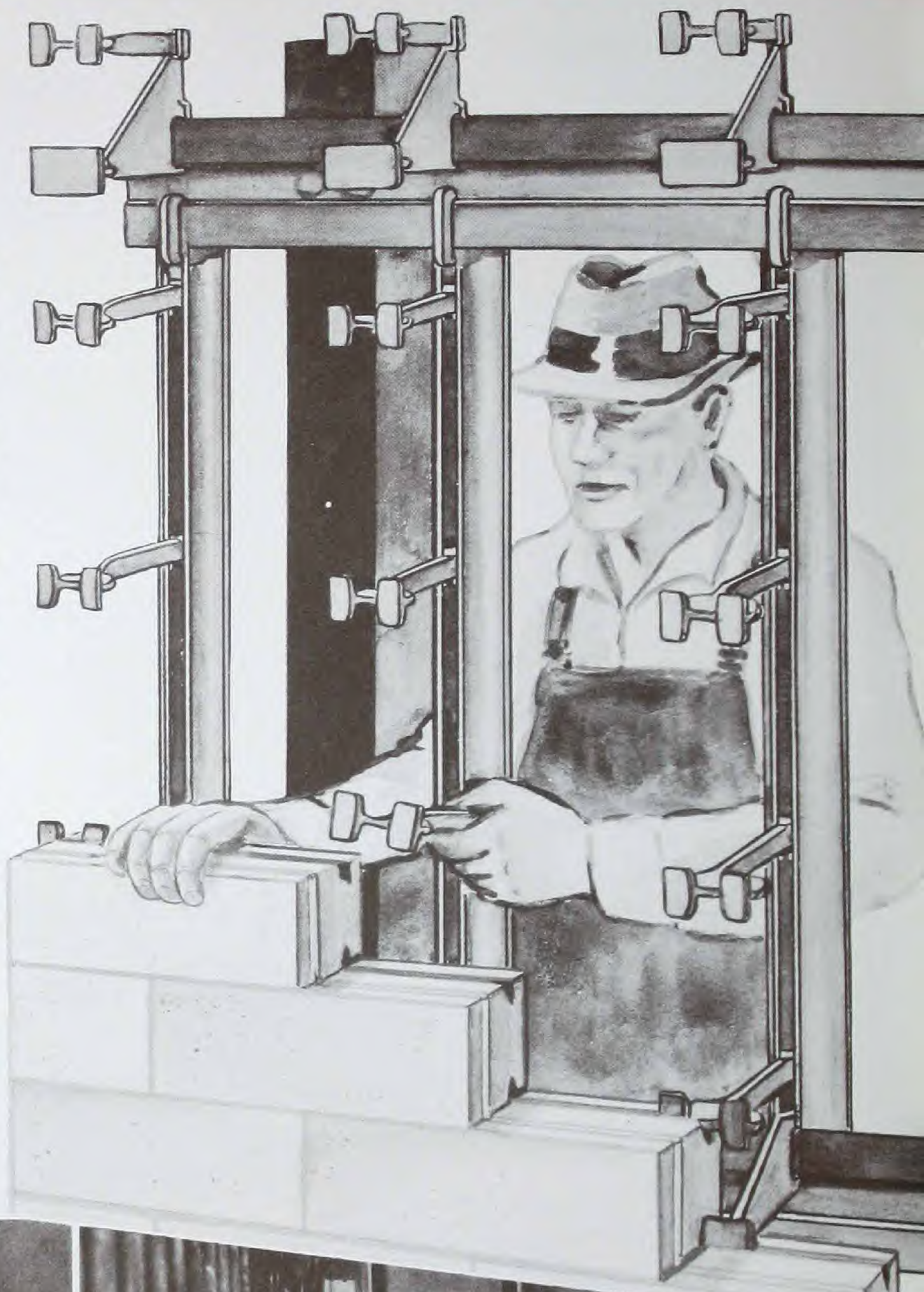
THINSULITE Suspended Walls are offered with a refractory thickness of 3" or 4½" backed up with from one to five inches of insulation. Any desired condition of heat transfer and outside temperature can be obtained.

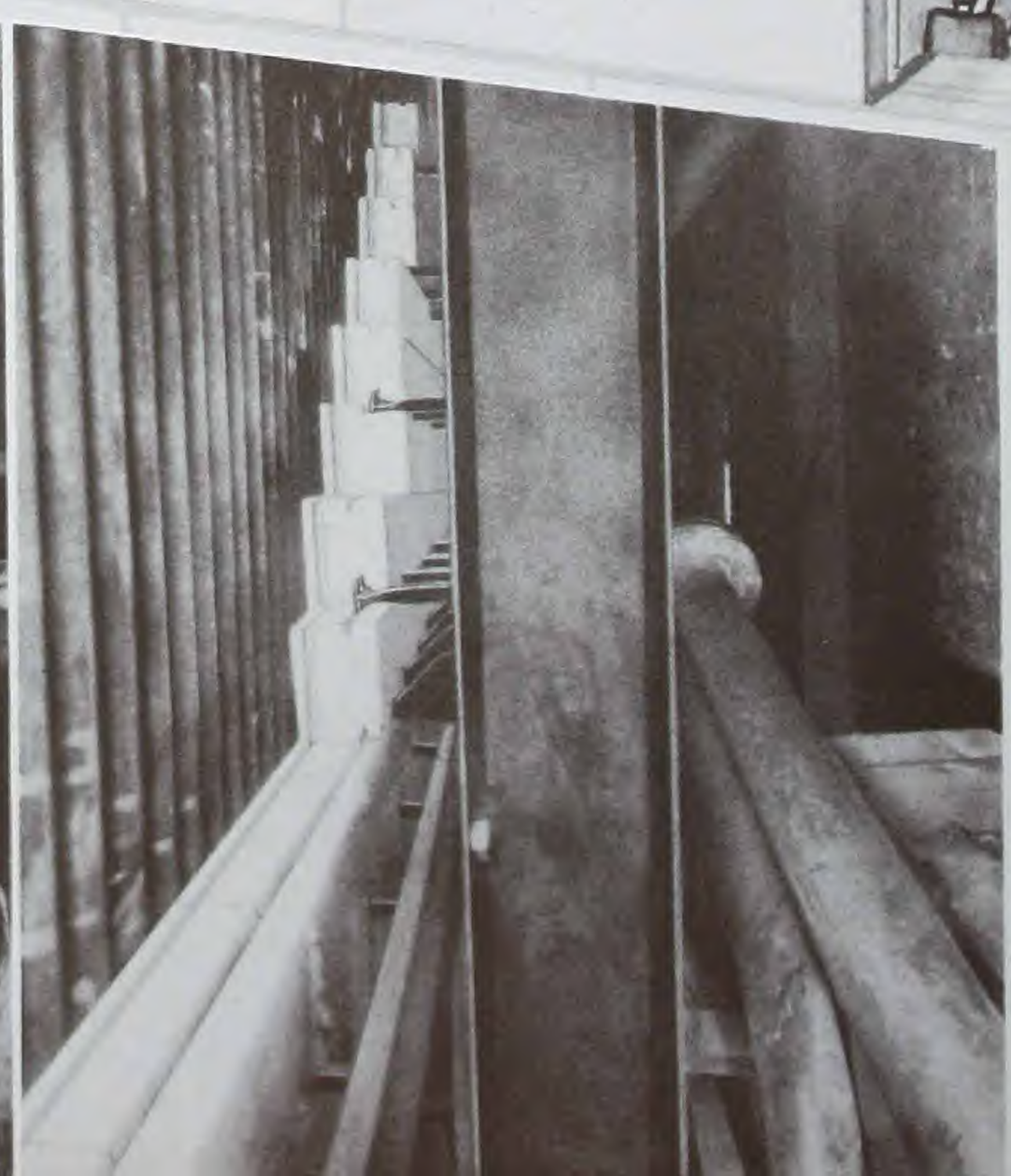
The refractory tile are of a size and shape that can be accurately made by the dry press process, so that they can be laid up evenly and uniformly. There is a DETRED tongue and groove arrangement on all four sides of each tile, so that a maximum air tightness is obtained. The tile are laid with staggered joints to obtain the maximum monolithic effect while still affording an opportunity for the wall to expand and contract.

At each horizontal support there are shelf castings which support and tie-in the sections of tile. Between the supporting castings are retaining castings which hold the tile in positive vertical alignment. The cross sections of these castings are small where they go through the insulation, so that a minimum amount of heat is conducted through the insulation. The horizontal castings are bolted to the vertical buckstays . . . but the vertical retaining bars and the actual tile-engaging castings are merely hung in place to provide maximum flexibility.

A THINSULITE Wall can be built either from the inside or outside of the Furnace as conditions necessitate.

THINSULITE Walls present a hard firebrick lining which will not spall or crumble, will resist an ordinary amount of abrasion and provide an air tight and heat tight construction.





TURE of THINSULITE

sectionally supported

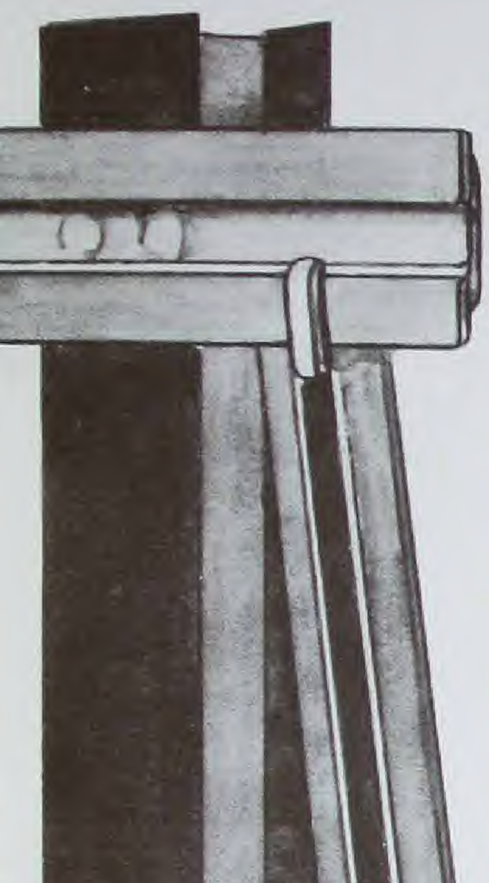
individually held

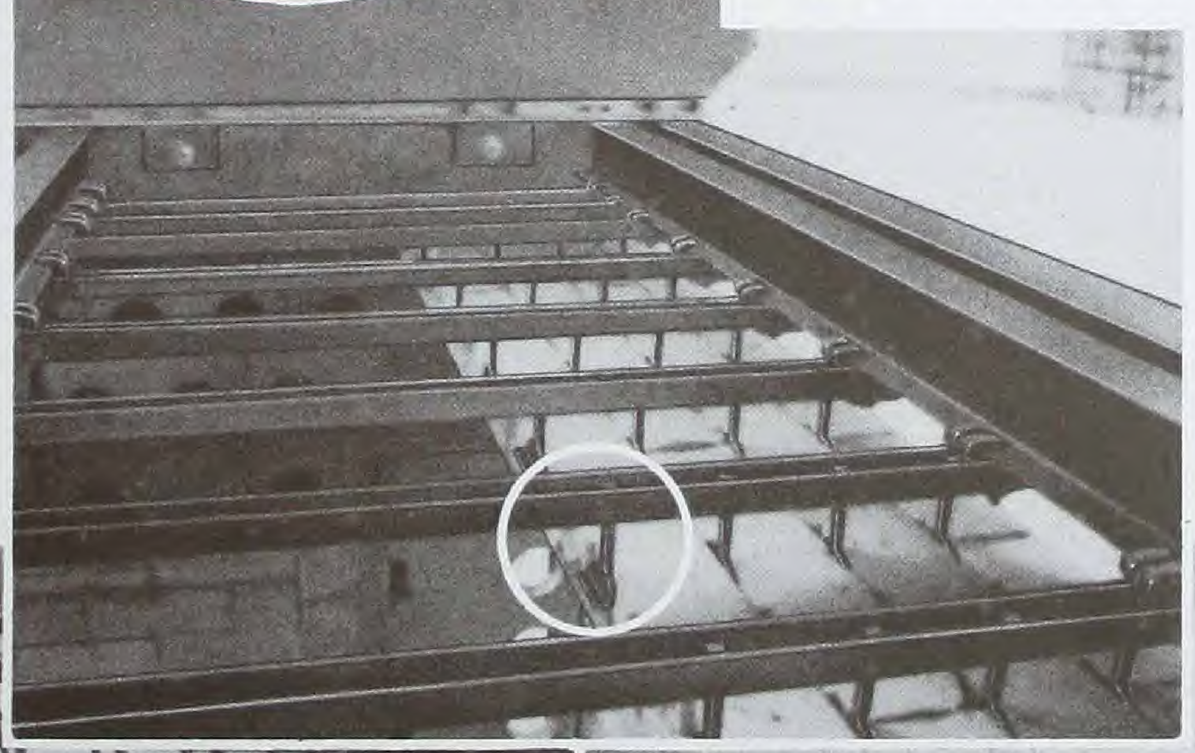
arches

The same shapes of 3" or 4½" tile that are used in the THINSULITE Wall are also used in the THINSULITE Arch construction. Steel beams span the furnace to carry the load and from these are suspended arch supporting cast iron bars. The actual tile supporting hangers fit into slots in these arch bars to allow maximum flexibility of movement. Like the wall castings, a very small section of the arch casting comes through the insulation, keeping heat transmission to a minimum. Both the arch and wall supporting castings which are in contact with the tile are made of heat resisting Meehanite iron.

From the construction illustrations below, the ease and simplicity of the THINSULITE Arch installation is evident. Note that each support casting holds the adjacent sides of two refractory tile . . . thereby giving each tile support on both sides. In addition all four sides of each tile mesh through tongue and groove with the tile surrounding it. Joints are filled with a refractory mixture which permits the suspended arch sections to expand and contract. The treads on the sides of the tile hold the refractory mixture from falling out.

After the refractory tile are hung, the arch may be covered with insulation either in block or loose material form. The ease with which this material may be placed in position is apparent from the illustrations below.

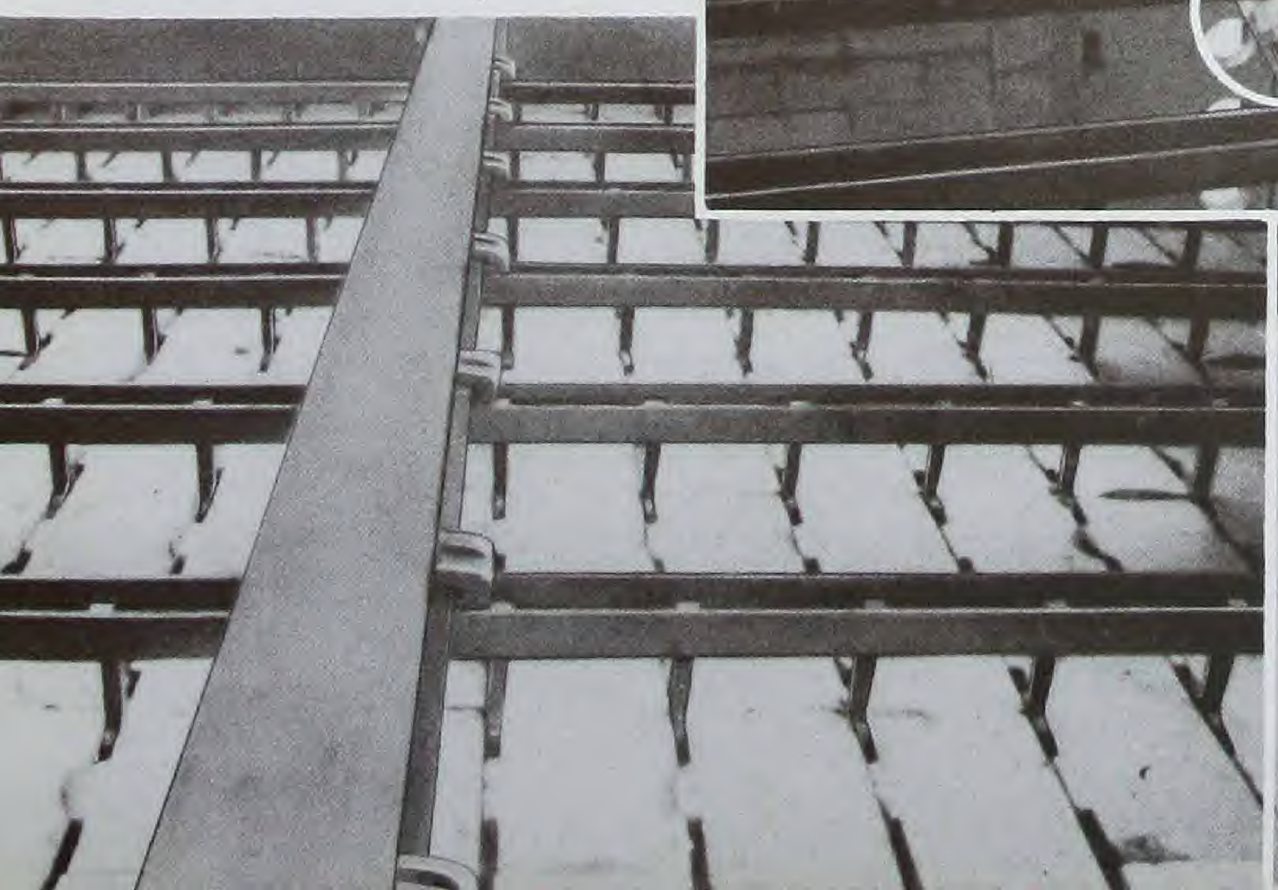


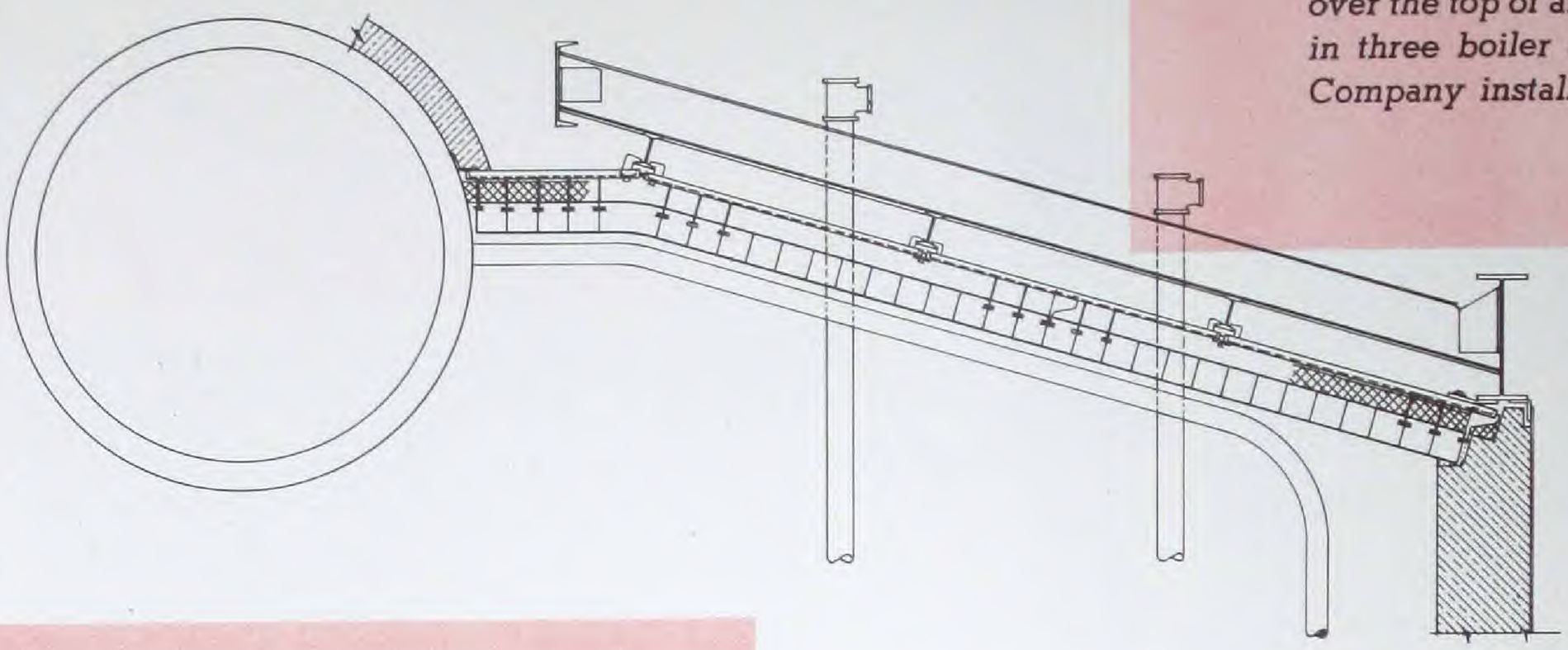


THINSULITE Refractory Arch in course of construction . . . showing steel beam . . arch supporting cast iron bars . . . and tile support casting and refractory tile.

THINSULITE Arch ready for insulation . . . block or loose.

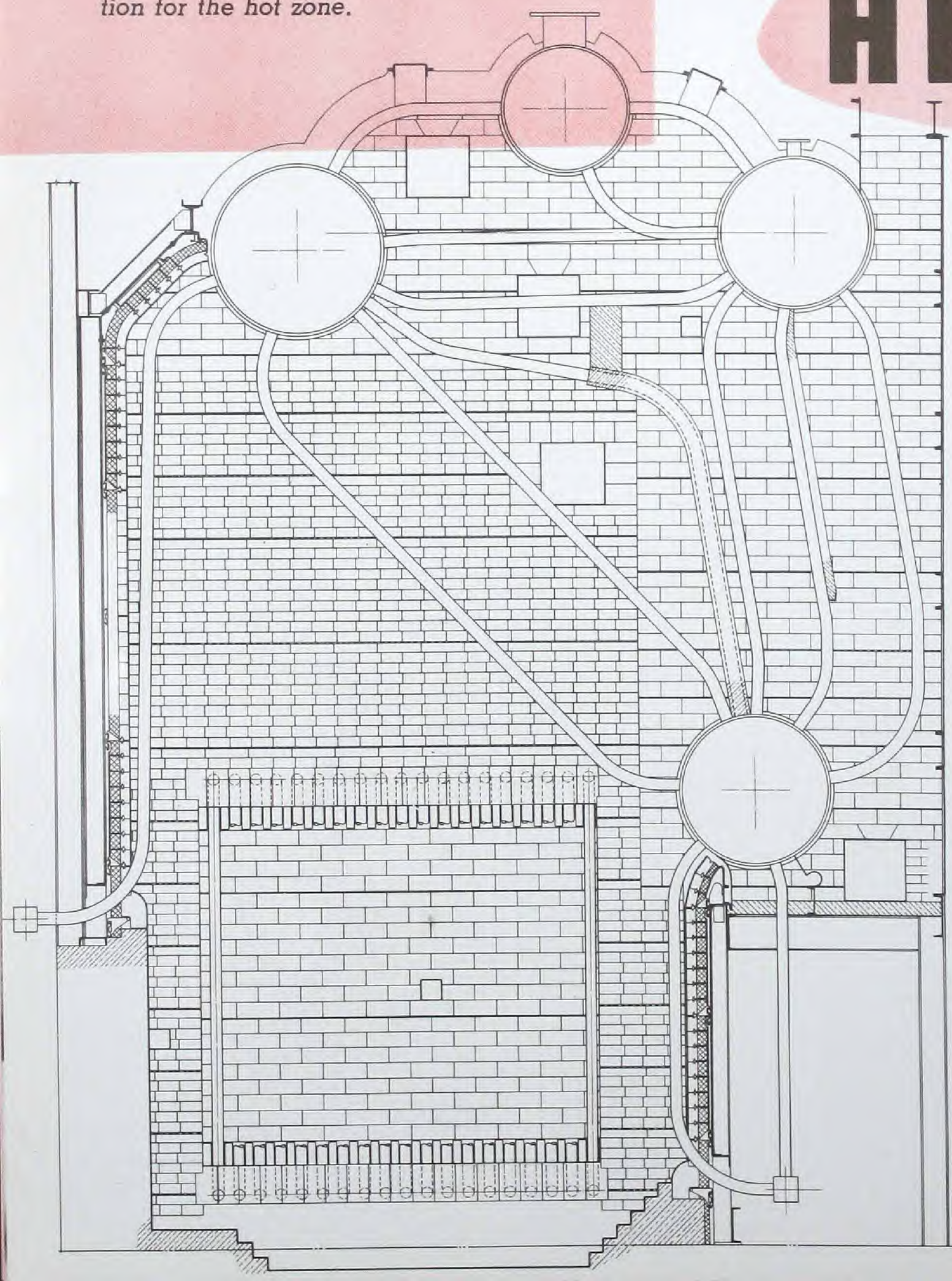
Interior view showing THINSULITE Arch and Walls. Note the smooth uniform appearance.





Typical THINSULITE Arch as applied over the top of an Economizer section in three boiler settings for a Utility Company installation.

Oil fired boiler in an Oil Refinery using THINSULITE Walls for water wall backing and rear section of the boiler. Standard DETRED construction for the hot zone.

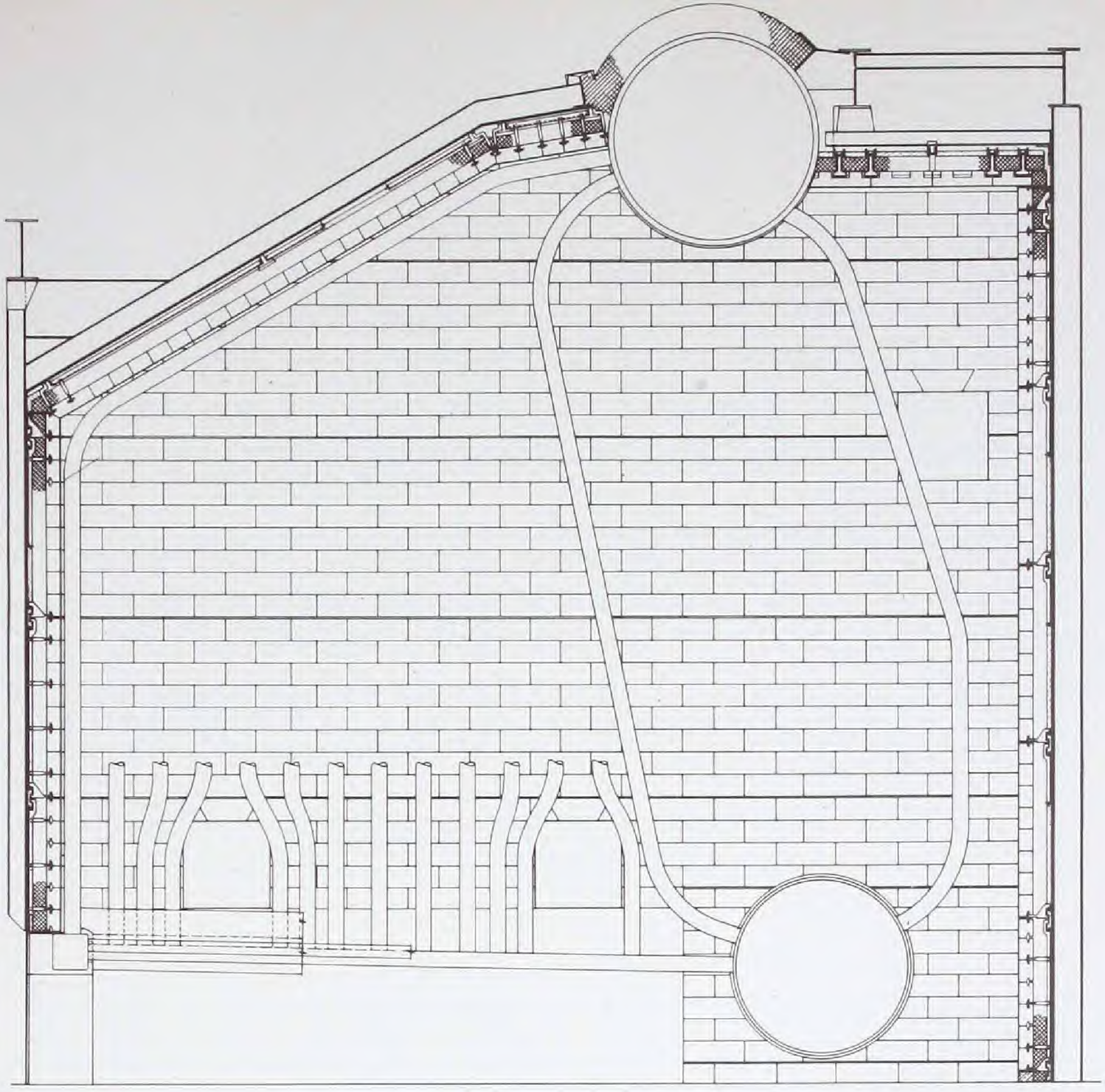


HEAT TIGHT *and* AIR

The THINSULITE construction is made *heat tight* by applying sufficient insulation to achieve the outside temperature desired. The castings which support the tile and the castings which tie the tile in place are properly designed to radiate enough heat to keep the inner flanges of the castings at safe working temperatures. At the same time the sections of the castings passing through the insulation are a very small portion of the total area. (A cross section through the insulation shows 99½% insulation and ½% cast iron.) The total amount of heat dissipated through the castings is very small.

The THINSULITE construction is made *air tight* by laying the tile in staggered courses and designing each tile with corrugations or treads on all four sides which intermesh to make the construction air tight and to retain joint material.

The expansion joints in the wall are provided with a refractory mixture which will not crumble or fall out, to allow the sections to expand when heated and to contract when cooled without setting up strains in the refractory. The wall is designed to be as HEAT TIGHT and as AIR TIGHT as possible and yet permit "breathing" with temperature changes . . . to assure a permanent structure.



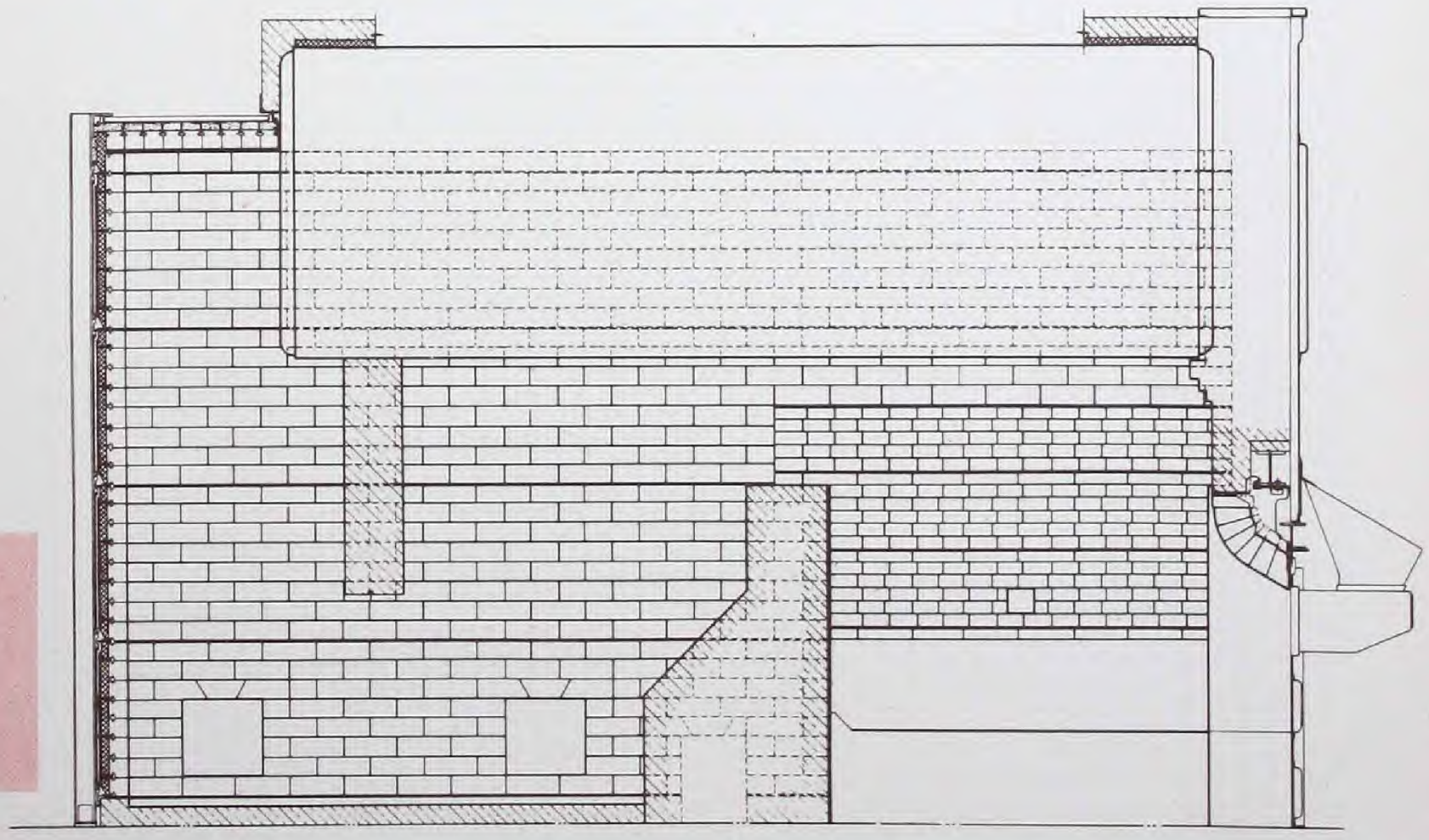
THINSULITE Wall and Arch applied to an integral type boiler furnace . . . both as backing for the bare-tube water walls and as the complete boiler enclosure.

Complete Suspended Enclosures

TIGHT *yet breathes!*

There are many outstanding advantages in the use of the DETRED principle throughout the entire Furnace enclosure. The THINSULITE construction now makes this possible at a nominal cost. Heavy DETRED construction may be used in the high temperature zones and THINSULITE for the balance of the setting. Together they give freedom from maintenance, less outage, less heat loss and less air leakage. THINSULITE is a permanent flexible structure that does not develop openings and cracks due to the movements from heating and cooling.

Illustrations on these two pages are examples of typical installations where the high temperature exposed areas of the furnace are built of standard Detrick DETRED construction—that have long proved their ability to stand this service—and where the somewhat cooler parts of the Furnace are built of 3" or 4½" THINSULITE construction.



Return tubular setting using standard DETRED Arch and Wall construction in the combustion chamber and 4½" THINSULITE Arch and Wall for the balance of the setting.

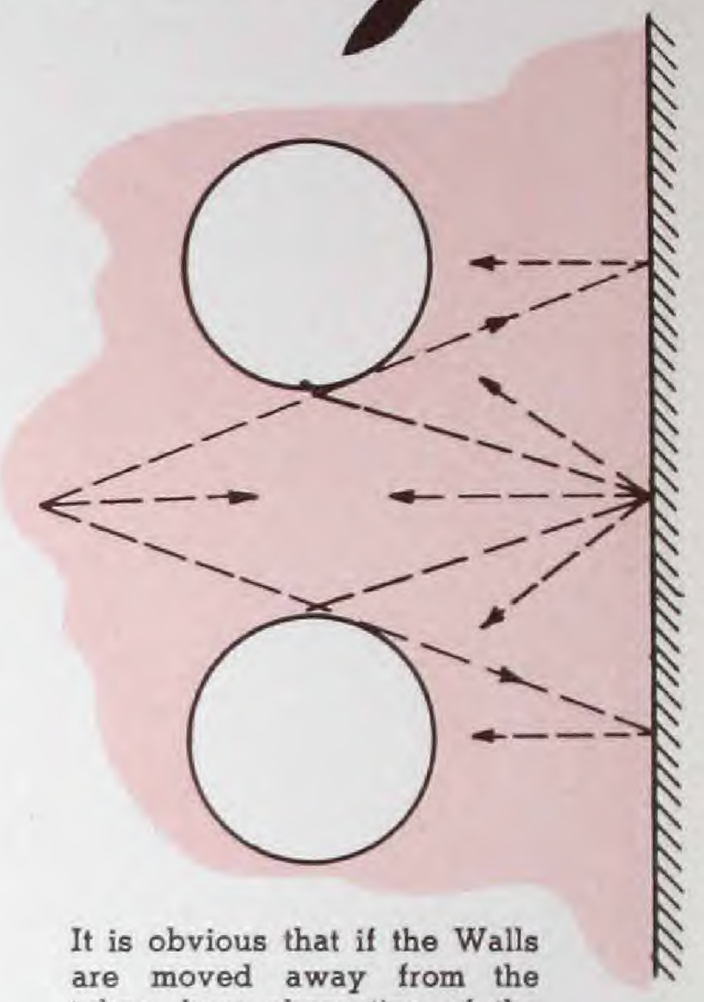
WATER WALL *Backing*

● THINSULITE is ideal for areas in back of water walls because it is a self-supporting structure, entirely independent of the tubes. Tubes are free to expand and contract independently. Thus strains are avoided which open up cracks in the wall and cause heat and air loss.

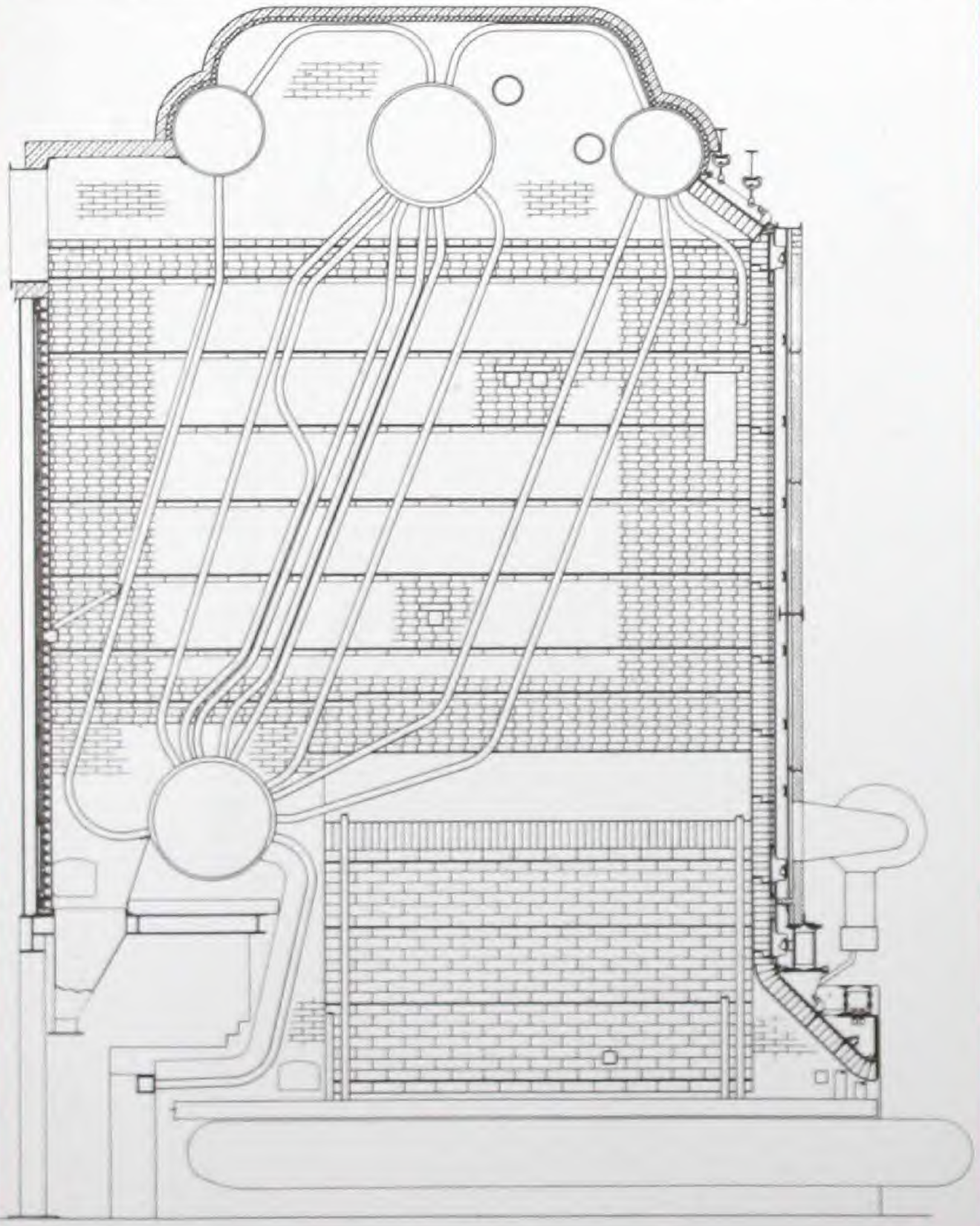
The THINSULITE installation is a permanent water wall backing, and even when the tubes are replaced it is not necessary to disturb the wall because it is suspended independently.

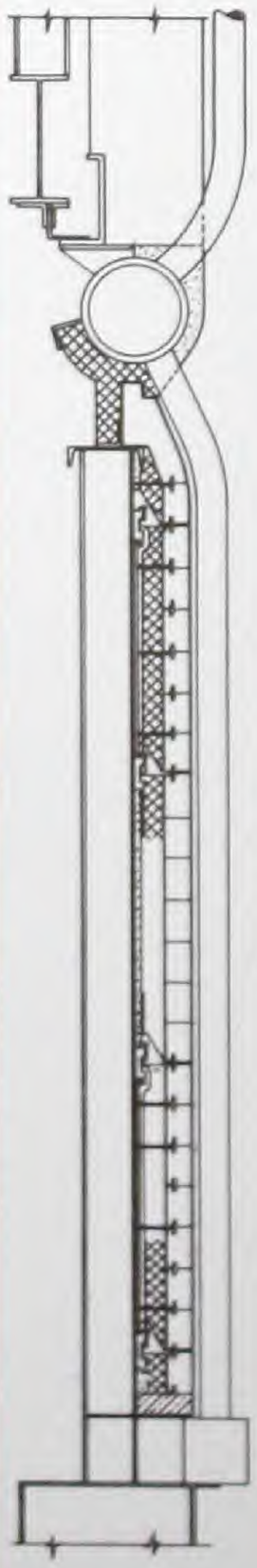
With all these advantages the THINSULITE Wall costs very little more than ordinary shiplap construction.

1. Typical complete suspended enclosure of DETRED in hot zone and THINSULITE Wall and Arches in cool zone.
2. Cross section of THINSULITE Water Wall Backing on boiler shown to the left.
3. Note how THINSULITE construction of Walls and Arches can be designed to fit any water wall contour.



It is obvious that if the Walls are moved away from the tubes, heat absorption of the tube is increased and the average temperature on the face of the Wall is decreased. THINSULITE construction makes it possible to build the wall an inch or more from the tubes.

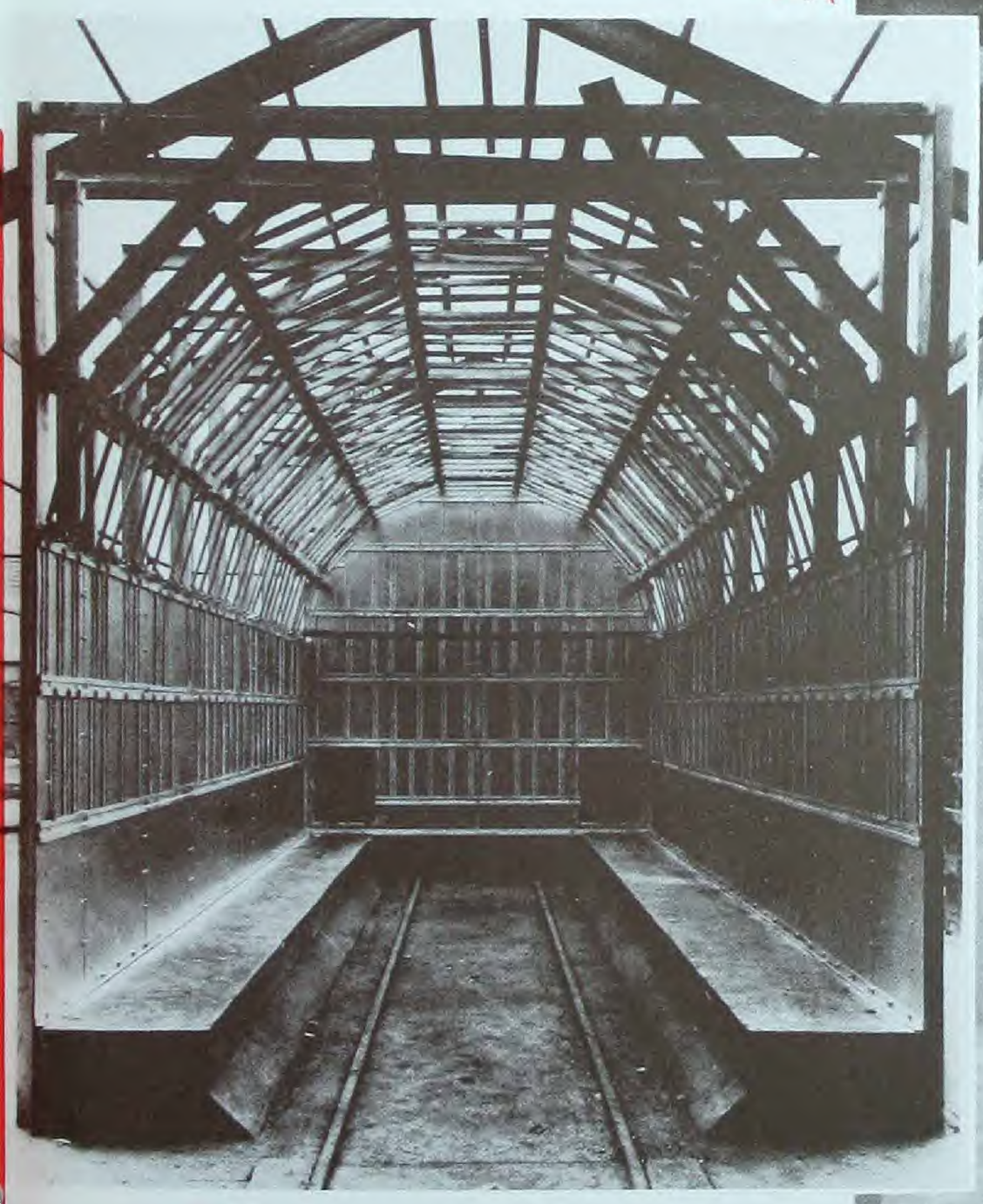


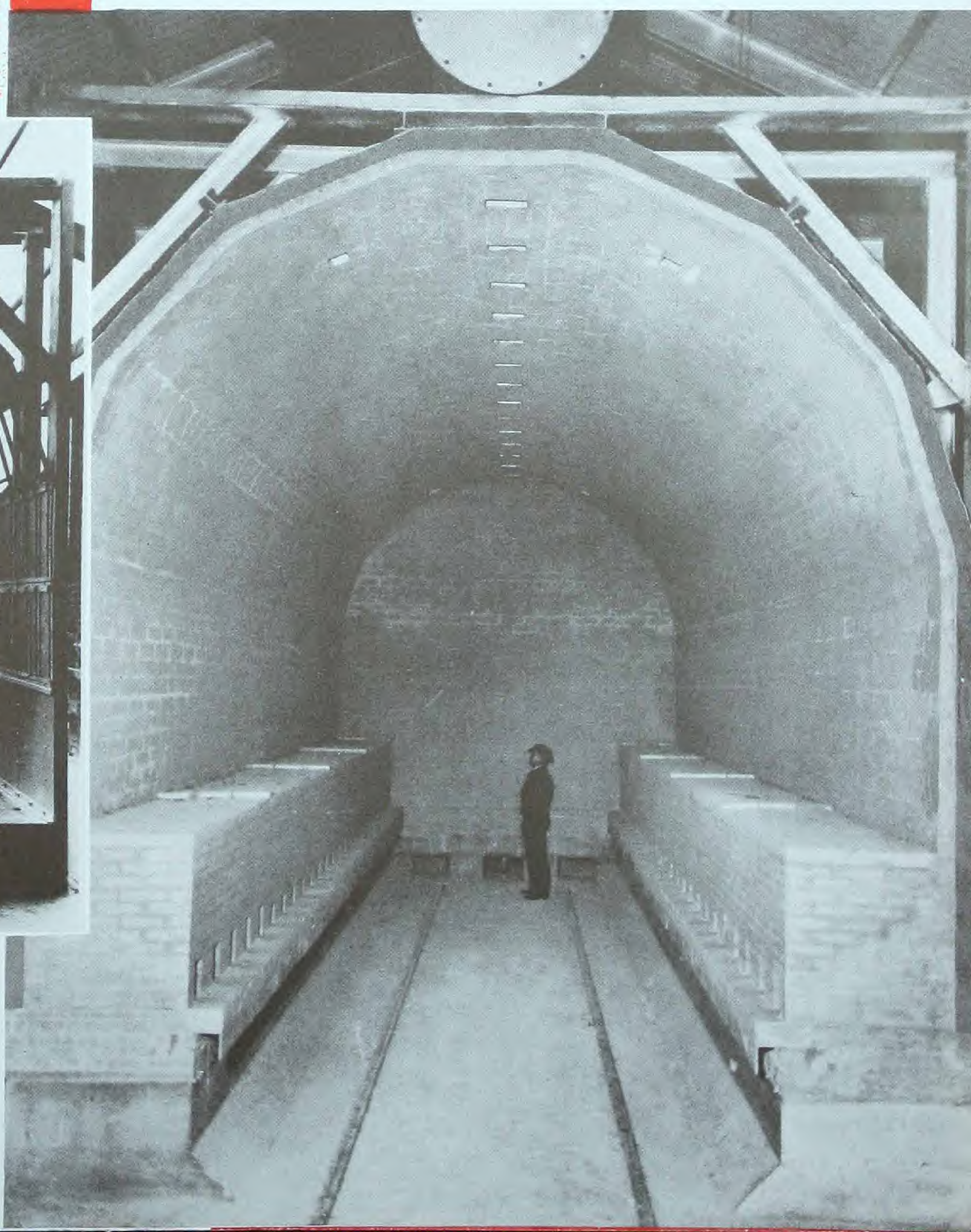


Free TO MOVE UNDER Heating AND Cooling

Individually Suspended Intermeshed Air Tight

Even under conditions of extreme temperature fluctuations the THINSULITE construction remains AIR TIGHT and HEAT TIGHT. This is because each tile is individually suspended and the castings and tile are free to move under the wide changes in temperature.





Application of THINSULITE Arch and Wall to a Stress Relieving Furnace.

Note the uniform application of Insulation over Wall and Arch. Also the simple assembly of Arch and Wall Bars and economical steel construction.

HEATER FOUNDATION *Costs Decreased...*

•

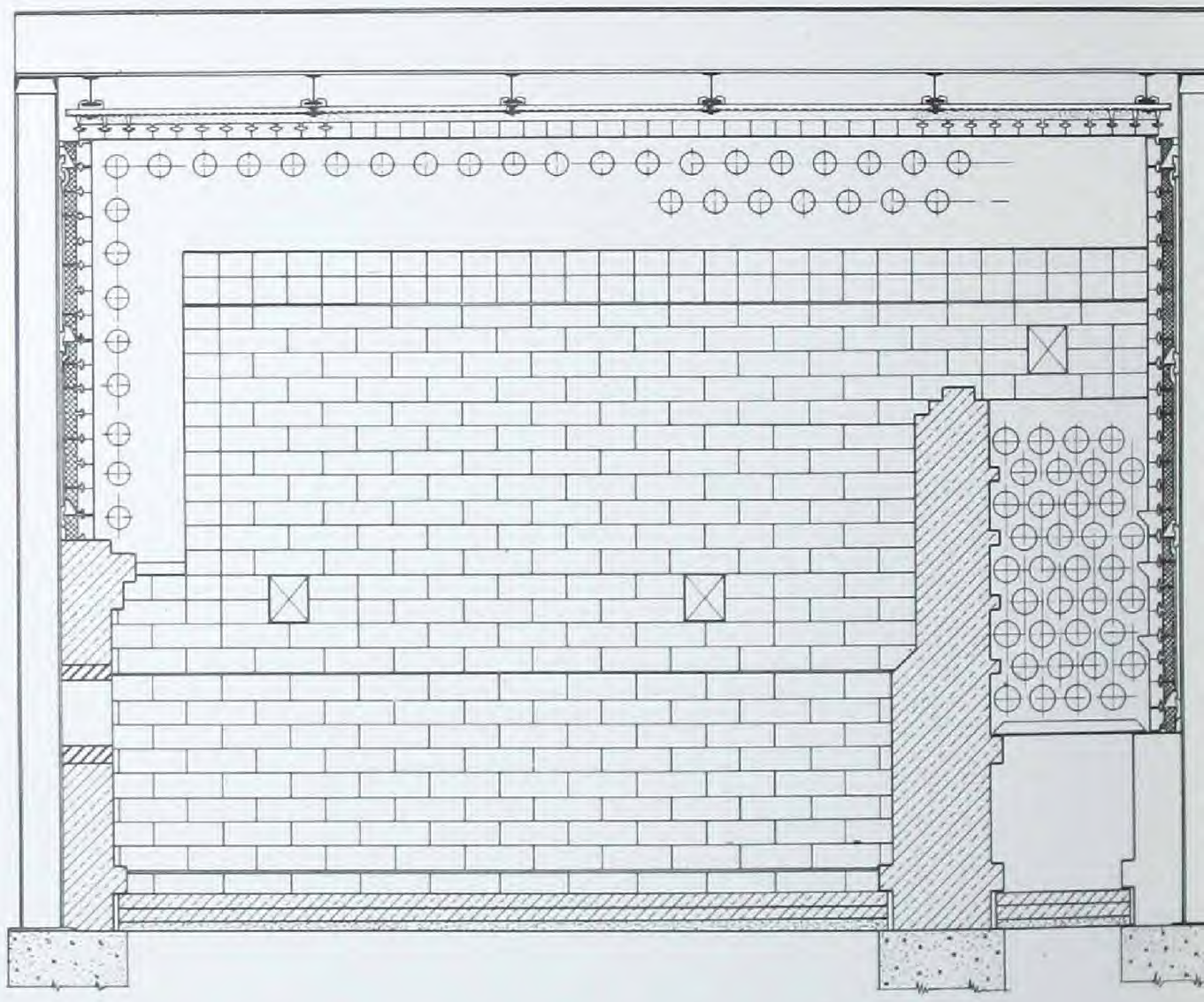
LESS MATERIALS NEEDED

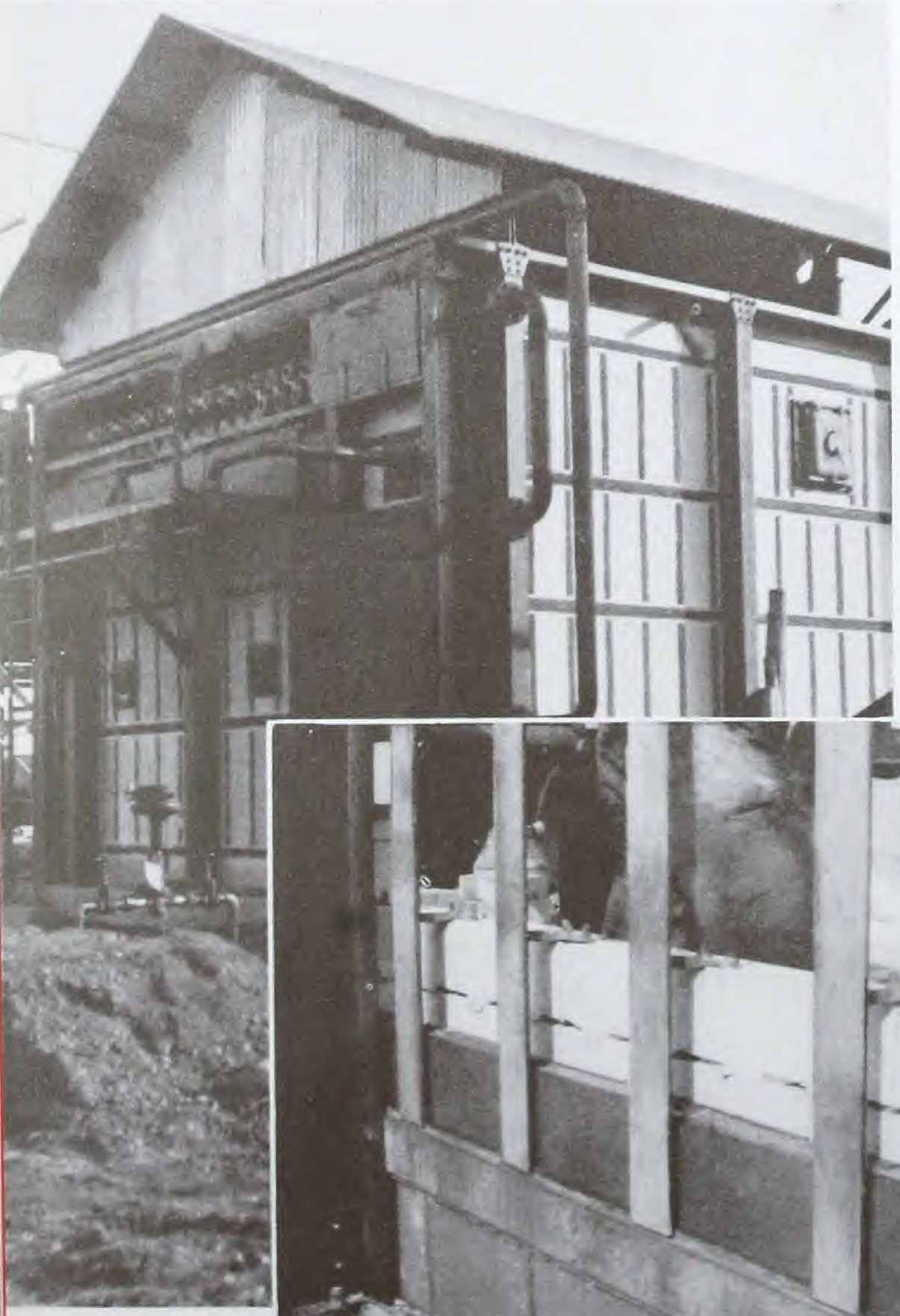
Building TIME Reduced

LIGHT WEIGHT

The development of Detrick THINSULITE has made possible the construction of heaters used in oil refining processes at lower cost than ever before, eliminating bulk in cases where not needed and at the same time giving adequate strength.

The simplicity of the Wall makes it easy and quick to construct, reducing the cost and time of building the





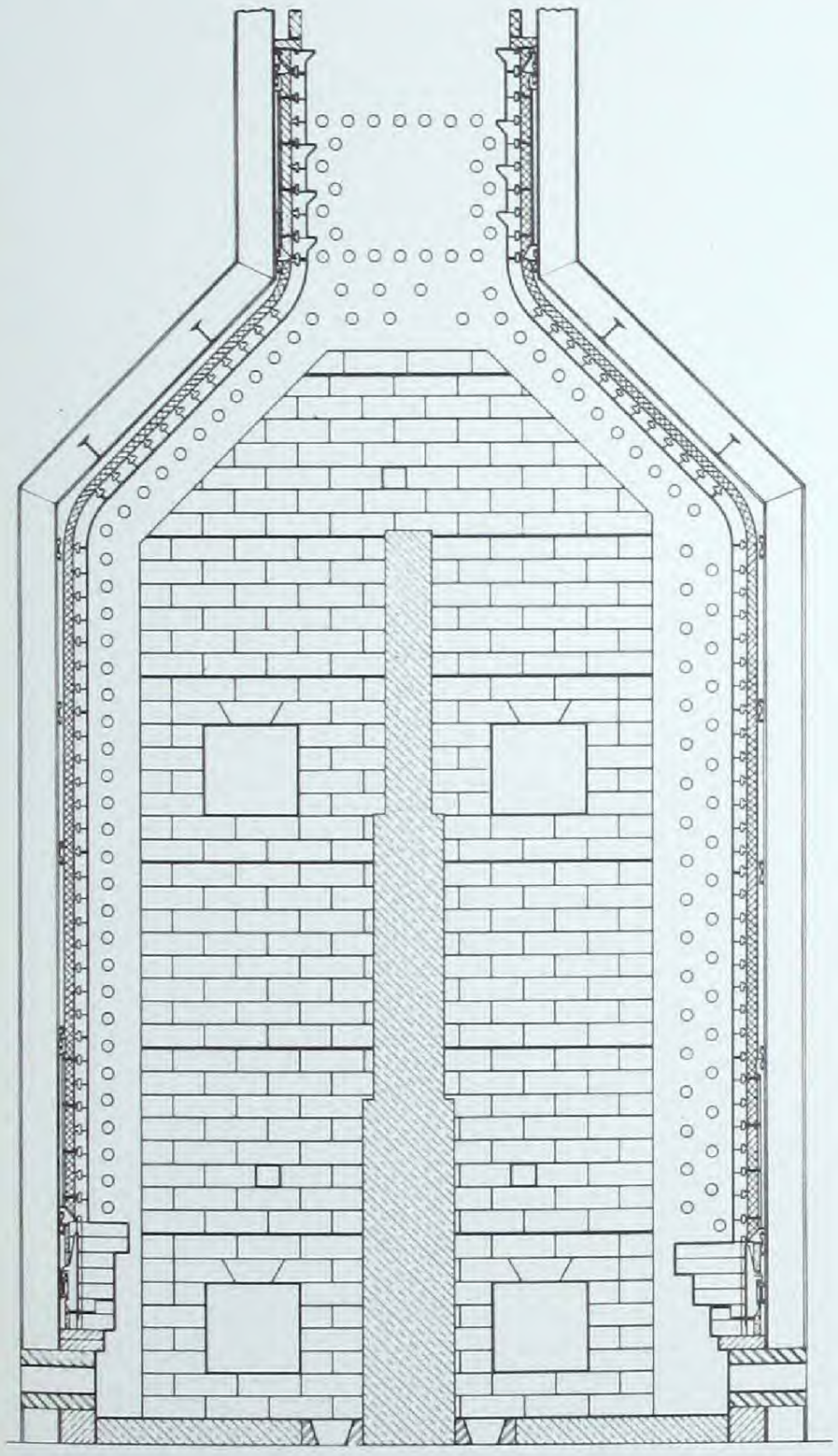
Conventional type of oil still with THINSULITE Wall and Arch. Note side walls are exposed to radiant heat. Construction photograph and completed photograph of conventional type still. Note outside finish of Detrick special hard weather-proof surface material, taking the place of steel casing.

LONG LIFE

furnace. There are fewer pieces to handle and the Wall is designed to take standard sizes of Insulation Blocks without cutting or trimming.

The THINSULITE Wall is designed to be built either with or without casing. When the casing is eliminated a hard weather proof finish is applied on the outside of the Insulation at much less cost than for the casing.

Stands Up under HEAT TEMPERATURE CHANGES • CONTINUAL SERVICE



The cross-section drawing above shows application of THINSULITE construction and Detrick Block Insulation to a Universal Oil Products Company Centerwall Updraft Heater.

THINSULITE has been proven adaptable for use in the construction of Universal Oil Products Company's Centerwall Updraft Heaters which are used extensively through the industry in Dubbscracking and other processes of Universal.

DETRICK INSULATION

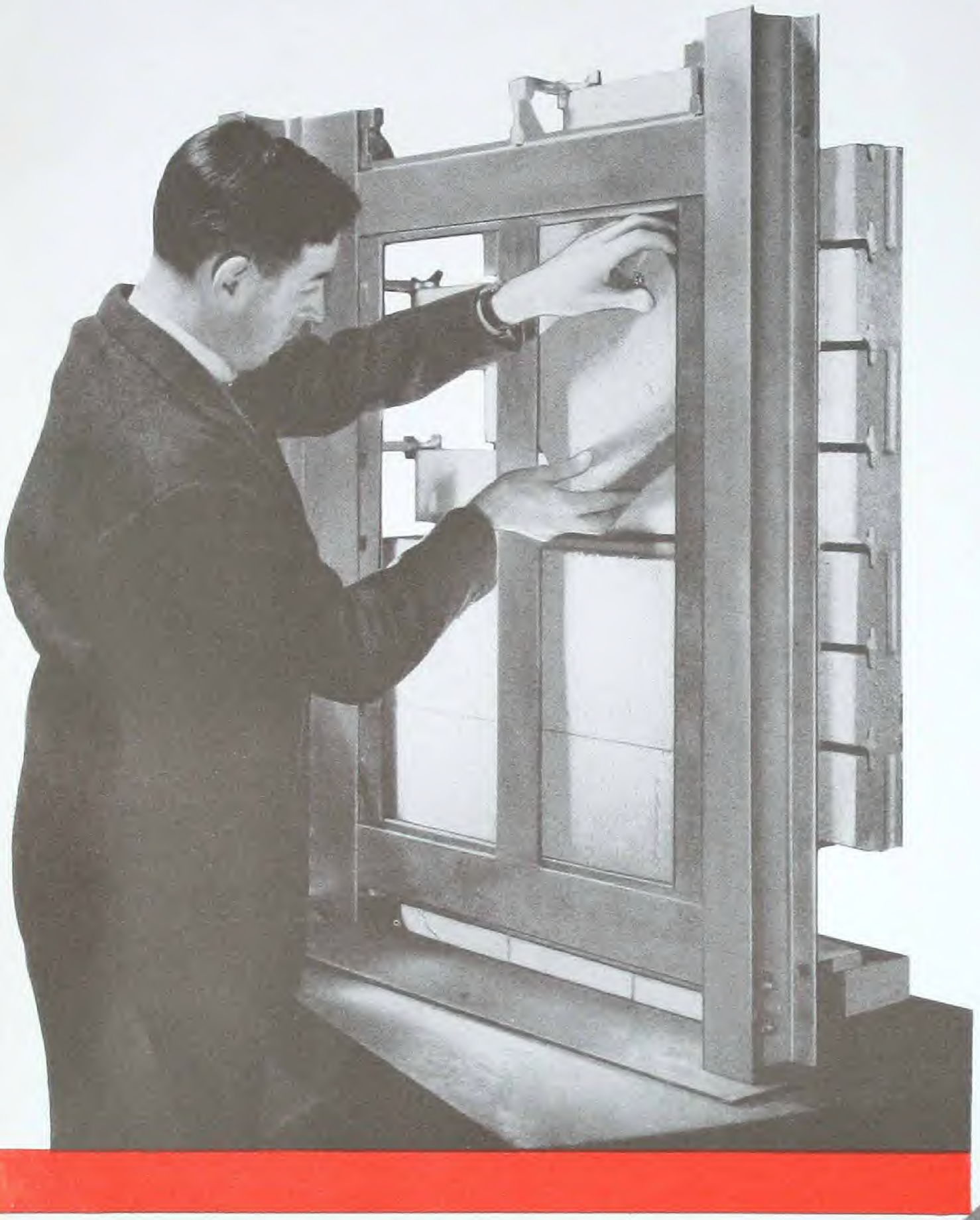
Detrick Insulation is available in three forms . . . Blanket . . . Block . . . and Plastic . . . and is made by the M. H. Detrick Company.

Detrick Insulation is particularly fitted for the THINSULITE construction. It has high insulation value . . . it resists high temperatures without disintegrating . . . and it is easy to apply.

It is backed by years of engineering experience in the application of insulation for heat conservation.

Detrick Insulation can be had to fit any job! Let us send you a sample for test.

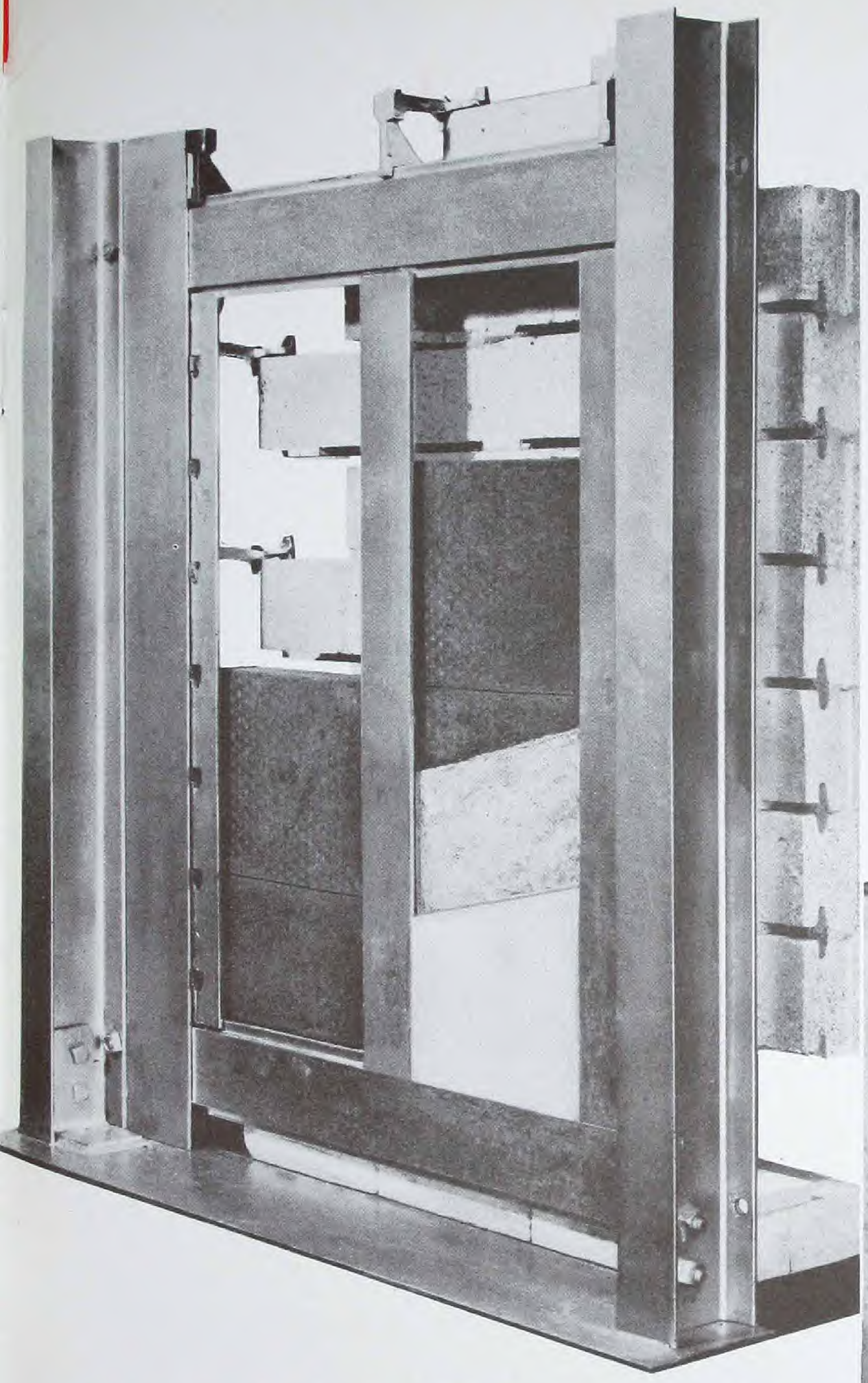
THOROUGHLY *Insulated*



● Thinsulite Arches and Walls can be designed for any amount of insulation. The insulation is very easily applied, as shown in the accompanying photograph. The insulation is held tightly against the refractory so as to give it the maximum effect. The cast iron supports, which come thru the insulation, are a small cross section (½% of total area) so that the efficiency of the insulation is kept at a maximum. On the following pages are shown temperature gradients and heat transfers thru Thinsulite Walls and Arches, for various thicknesses of insulation.

Standard sizes of block Detrick insulation applied to the Thinsulite Wall. The joints between the blocks are filled with a Detrick bonding cement to produce an air tight and heat tight covering over the Thinsulite tile.

Detrick Plastic insulation, and special Detrick Hard Finish are applied over the block insulation. This material is "tucked" under the lip of the vertical castings, which are spaced at 12½" centers, so that all of the insulation is firmly held in place.



Rear view of Thinsulite Wall showing Detrick block insulation, thin coat of Detrick plastic insulation and smooth finish of Detrick Hard Surface material flush with the outside of the castings. The hard surface material may be applied when the thin coat of plastic is wet. It forms a weather proof finish which does not shrink and eliminates the necessity of costly steel casing.

THINSULITE APPLICATIONS

The high insulating efficiency of Thinsulite construction permits it to be used in a large variety of furnace conditions. In the boiler furnace it can be used for water wall backing and all of the area not exposed to abrasion and direct radiant heat.

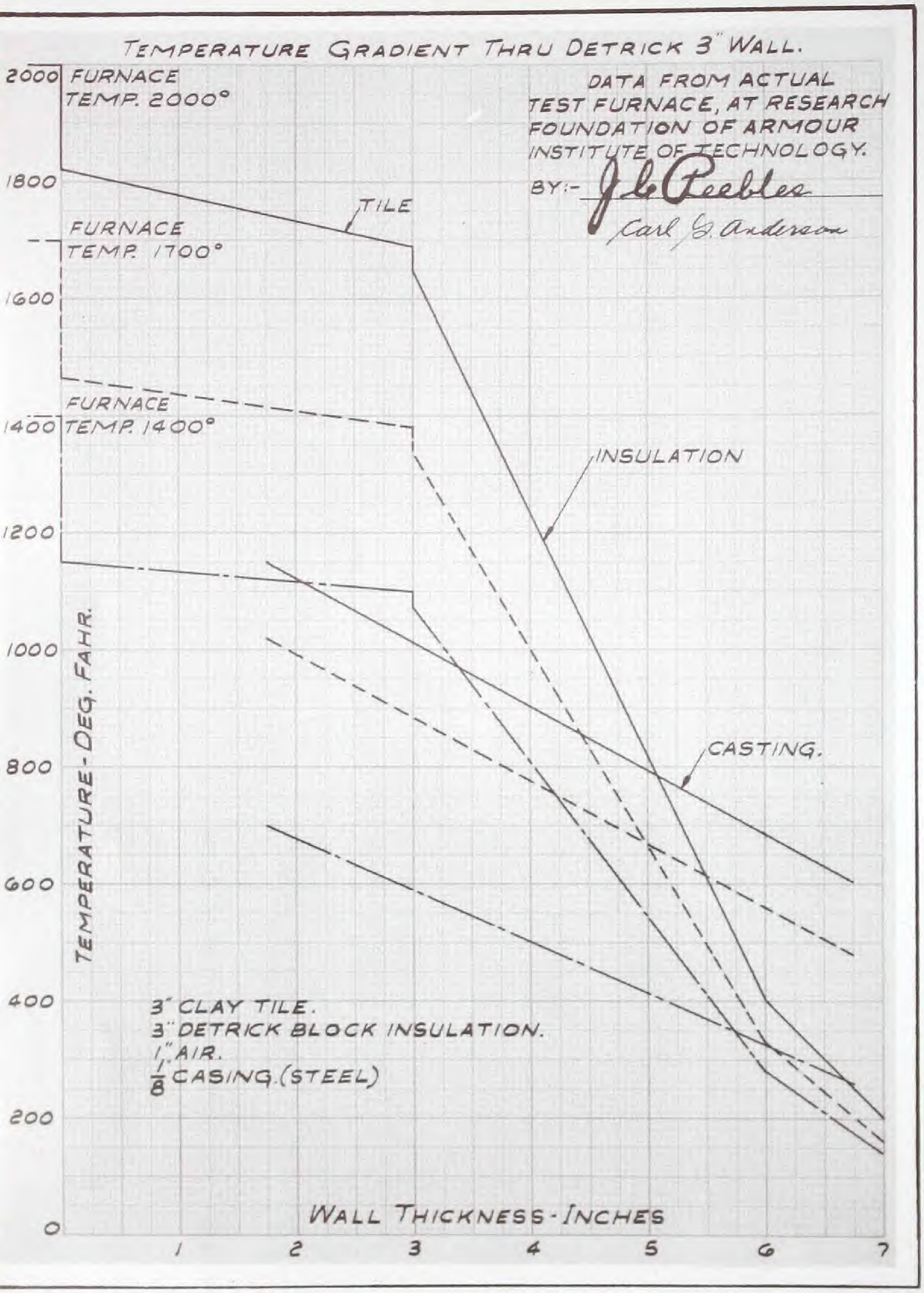
In the oil still furnace it can be used for the entire furnace enclosure whether exposed to radiant heat or not.

There are many other applications such as waste heat furnaces, flues and ducts, and heat-treating furnaces.

Thinsulite construction may be economically applied to almost any type of furnace where abrasion, spalling or slagging is not likely.

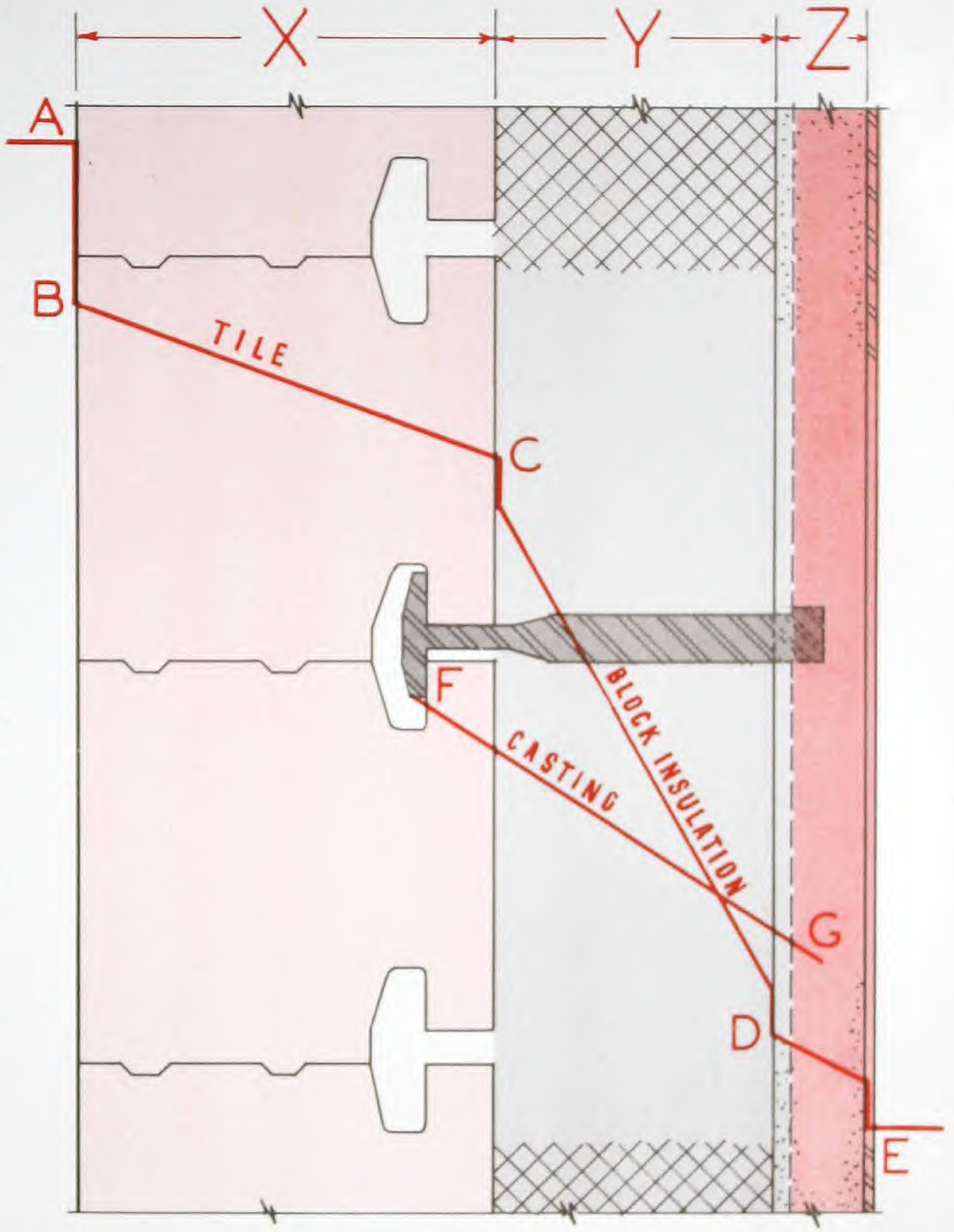
Installation photographs showing the Special Detrick Hard Surface Finish being applied to the outside of an oil still. In the upper photograph, notice that in the left panel the block insulation is exposed, the Hard Surface Finish has not yet been applied.

LABORATORY TESTS PROVE HIGH EFFI



● The above temperature gradients are based on an actual furnace test conducted by the Research Foundation of the Armour Institute of Technology on Thinsulite Arches and Walls. The test furnace was set up in an ordinary laboratory room, with comparative still air condition. Subsequent field tests show that the outside temperatures are somewhat lower in an ordinary boiler room or out of doors where the movement of air has the effect of lowering the outside temperature.

CIENCY OF THINSULITE CONSTRUCTION



The accompanying table is based on the Armour Institute test on the opposite page . . . except that the values have been calculated to approximate operating conditions and include the heat loss through the castings.

The calculations are based on 70° outside moving air.

Note * indicates the heat loss and temperatures are approximately the same whether casing is used or not.

					1500°						1800°						2000°					
Tile "X"	Block Ins. "Y"	Outside Material "Z"		Casing	A—1500° Furnace Temperature B—1250° Skin Temperature C	D	E	F	G	Heat Loss Sq. Ft.	A—1800° Furnace Temperature B—1560° Skin Temperature C	D	E	F	G	Heat Loss Sq. Ft.	A—2000° Furnace Temperature B—1820° Skin Temperature C	D	E	F	G	Heat Loss Sq. Ft.
3	2	1"	Air	Yes	1180	240	180	700	300	240	1470	260	200	900	450	300	1700	350	240	1000	500	440
3	2	1"	Plastic	*	1190	465	165	700	300	185	1480	560	185	900	450	250	1730	700	215	1000	500	340
3	2	1"	H.F.	No	1184	245	175	700	300	215	1475	270	195	900	450	290	1707	360	230	1000	500	400
4½	2	1"	Air	Yes	1150	236	170	650	250	205	1460	250	195	850	400	275	1690	380	235	950	450	410
4½	2	1"	Plastic	*	1167	455	155	650	250	170	1445	550	180	850	400	230	1682	650	210	950	450	325
4½	2	1"	H.F.	No	1155	240	165	650	250	190	1470	260	190	850	400	260	1700	390	225	950	450	380
3	3	1"	Air	Yes	1190	175	150	725	325	160	1480	240	195	1000	500	280	1720	290	225	1100	600	360
3	3	1"	Plastic	*	1200	367	140	725	325	140	1500	465	170	1000	500	200	1751	559	190	1100	600	254
3	3	1"	H.F.	No	1195	180	145	725	325	150	1490	250	185	1000	500	245	1733	300	217	1100	600	340
4½	3	1"	Air	Yes	1160	175	145	675	275	150	1440	235	185	950	450	245	1710	250	220	1050	550	345
4½	3	1"	Plastic	*	1180	360	135	675	275	130	1480	440	160	950	450	180	1718	553	185	1050	550	245
4½	3	1"	H.F.	No	1170	180	140	675	275	140	1450	245	180	950	450	230	1720	260	205	1050	550	320
3	4	1"	Air	Yes	1200	170	140	750	350	140	1500	210	180	1050	550	230	1750	260	200	1150	650	280
3	4	1"	Plastic	*	1215	330	130	750	350	110	1520	400	150	1050	550	160	1766	450	175	1150	650	210
3	4	1"	H.F.	No	1210	175	138	750	350	130	1510	215	175	1050	550	220	1759	270	195	1150	650	265
4½	4	1"	Air	Yes	1180	165	138	700	300	130	1480	200	175	1000	500	220	1730	250	195	1100	600	265
4½	4	1"	Plastic	*	1200	325	125	700	300	103	1495	395	145	1000	500	147	1740	430	180	1100	600	200
4½	4	1"	H.F.	No	1190	170	135	700	300	125	1470	210	170	1000	500	205	1739	260	190	1100	600	254

Pioneers

IN REFRACTORY ENGINEERING

From Detrick's early beginning, when the first Suspended Arch was developed, their pioneering spirit has been a guiding influence in Furnace design. Their leadership combined with that of others has resulted in the development of today's high temperature, high efficiency Boilers. This influence has extended to other fields including the steel industry and the oil industry, where Detrick walls and arches are so effectively used. Today, in combination with insulation, new ideals are being achieved. The THINSULITE construction is one more step in that direction.

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M.H.DETRICK COMPANY

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